REMARKS

Claims 1-11 are pending in this application. By this Amendment, the specification is amended to correct a translation error, as discussed further below. No new matter is added.

Applicants appreciate the courtesies shown to Applicants' representative by Examiner Haugland in the August 7, 2006 personal interview. Applicants' separate record of the substance of the interview is incorporated into the following remarks.

During the personal interview, Applicants' representative explained that the paragraph beginning on page 14, line 13, incorrectly uses the terms "faster" and "slower" to describe the timing of driving the buffer portion. This is apparently due to a translation error from Japanese to English. As discussed during the interview, both the machine translation of Japanese priority Application No. 2002-321350 (publication No. 2004-155533) obtained from the JPO website and the separate translation obtained by Applicants' representative indicate that these terms should have been translated to be "earlier" and "later," respectively. Copies of the machine translation and the separate translation are submitted herewith for the Examiner's reference.

As tentatively agreed during the interview, correction of this translation error does not introduce any new matter. Rather, the correction improves the readability of the specification, especially in light of the awkwardness of referring to the relative timing of driving components as "faster" and "slower." Applicants respectfully submit that the terms "earlier" and "later" are more properly used to describe such relative timing.

Claims 7 and 9 are rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. Applicants respectfully traverse the rejection.

The features recited in claims 7 and 9 are described by the specification as originally filed, for example, at page 14, lines 20-25. As discussed during the personal interview, properly translated into English, this text describes the buffer unit being driven (starts

driving) slightly earlier (before) the frictionally transporting section (drive rollers) starts feeding back (reversely rotate) the continuous paper, and the buffer unit being stopped (stops driving) slightly later (after) the frictionally transporting section (drive rollers) stops feeding back (reversely rotate) the continuous paper. Thus, this text adequately describes the subject matter of claims 7 and 9.

Applicants respectfully submit that this text does not describe "rates of driving" but rather relative timing of the driving of components. Further, as discussed at the interview, Fig. 3 and 4 are only representative, and do not show sufficient detail to illustrate the slight time differences between the starting/stopping of the buffer and drive roller.

Therefore, claims 7 and 9 fully comply with the written description requirement of 35 U.S.C. §112, first paragraph. Withdrawal of the rejection is respectfully requested.

Claims 5, 6 and 10 are rejected under 35 U.S.C. §103(a) over U.S. Patent No. 5,685,471 to Taubenberger in view of U.S. Patent No. 4,603,800 to Focke et al. (Focke). Further, claims 1-4, 8 and 11 are rejected, alternatively, under 35 U.S.C. §103(a) over Taubenberger in view of Focke or over Taubenberger in view of U.S. Patent No. 6,592,276 to Ohba et al. (Ohba) in view of Focke . These rejections are respectfully traversed.

Each of independent claims 1, 5 and 11 recites *inter alia* "a buffer unit provided between the paper-position restricting section and the frictionally transporting section and configured to come into contact with a surface of the continuous paper when the continuous paper is feeding back, and to separate from the surface of the continuous paper when the continuous paper is feeding forward." As admitted by the Office Action, Taubenberger fails to disclose, teach or suggest these features.

Ohba is cited only for its alleged teaching of locating a printing section downstream of feed rollers. Thus, Ohba does not remedy this foregoing deficiency of Taubenberger.

The Office Action refers to the festoon device 10 of Taubenberger as corresponding to the recited buffer unit. However, the festoon device 10 of Taubenberger is not configured to come into contact with a surface of the continuous paper when the continuous paper is feeding back, and to separate from the surface of the continuous paper when the continuous paper is feeding forward as recited in the pending independent claims.

On the contrary, as described in column 4, lines 8-19 of Taubenberger, the festoon device 10 is a mechanical web accumulator. The festoon device 10 has two fixed rollers and one oscillating roller. The oscillating roller is moved counter to a spring while in contact with the paper web A to hold the paper web A under a constant tension. Thus, the oscillating roller is always in contact with the paper web A and is not configured to come into contact with a surface of the continuous paper when the continuous paper is feeding back, and to separate from the surface of the continuous paper when the continuous paper is feeding forward. Further, the two fixed rollers of the festoon device 10 are always in contact with the paper web A and are not configured to come into contact with a surface of the continuous paper when the continuous paper is feeding back, and to separate from the surface of the continuous paper when the continuous paper is feeding forward.

As described in the specification of this application, the buffer unit is spaced apart from the continuous paper during the printing operation and only comes into contact with the continuous paper during back feeding. This may lead to various advantages such as those described on pages 12 and 13. In fact, the specification specifically teaches that such a conventional mechanical accumulator, required in prior art apparatus, is not required because of the buffer unit recited in the pending independent claims. See the first full paragraph on page 13 of the specification.

The Office Action attempts to overcome the deficiency of Taubenberger by modifying the device taught by Taubenberger, in view of the teachings of Focke, to have the festoon

device 10 only in contact with the web only when required for temporary storage of the web. The asserted motivation is "to eliminate unnecessary interference of the accumulator with the web when it is not necessary to store additional web material."

Applicants respectfully submit that a person of ordinary skill in the art would not have been motivated to make the asserted combination of Taubenberger and Focke, let alone the alleged modification of the device taught by Taubenberger.

Taubenberger relates to a printing device for processing continuous paper (Abstract). The "accumulator" 10 in Taubenberger is specifically designed to provide high positional accuracy of conveyance for printing on a continuous web (col. 2, lns. 64-66).

On the other hand, Focke relates to a device for processing sheets of material in which an end of one sheet of material 12 is joined to an end of a second sheet of material 13 (col. 2, lns. 57-61). This difference in purpose leads to a difference in operation of the device according to Focke. Specifically, the device of Focke requires the ends of the sheets of material to be stopped momentarily in order for the ends to be joined (col. 2, lns. 61-63). However, Focke teaches that the device is to be run continuously "without any interruption in the delivery of the sheet of material 12" (col. 2, lns. 63-65).

To this end, the device of Focke includes a rocker 10 that accumulates the sheet material 12 prior to the start of the splicing operation, and then allows the accumulated sheet material 12 to be gradually dissipated as the sheet material 12 is continuously fed on the discharge side in the region of constantly running draw rollers 37, 38. In other words, the rocker 10 accumulates the sheet material 12 so that "there is no interruption in the continuous conveyance of the sheet material 12 on the discharge side." See column 4, lines 16-27.

The accumulator (rocker) 10 taught by Focke is completely unrelated to positional accuracy, and serves only the entirely unrelated purpose of allowing ends of sheet materials to be joined or spliced without interrupting the conveyance of the sheet material (output). Thus,

if the teachings of Focke were to have been applied to the printing device of Taubenberger, a person of ordinary skill in the art would not have been motivated to modify the "accumulator" 10 in the printing device of Taubenberger, as alleged by the Office Action, but only to add a supply rocker 10 upstream of the "accumulator" 10 in the printing device of Taubenberger to allow a continuous feed of web, for example, as one supply roll runs out and is replaced with another supply roll.

Further, the teachings of Focke do not suggest the motivation alleged by the Office Action. The specific purpose of the supply rocker 10 taught by Focke is to allow continuous output of sheet material while ends of difference sheets of material are joined in a splicing process. Nowhere does Focke disclose the alleged motivation of eliminating unnecessary interference with the web.

Taubenberger also fails to suggest the motivation alleged by the Office Action because its specific purpose of providing high positional accuracy for printing implies that no "unnecessary interference" is caused by the festoon device 10.

Applicants respectfully submit that the teachings of Taubenberger and Focke must be considered as would have been apparent to one skilled in the art, without impermissible hindsight reasoning regarding an advantage that is not taught or suggested by the prior art. MPEP §2143.01, I.

Moreover, as noted above, the "accumulator" 10 in the printing device of Taubenberger is specifically designed to provide high positional accuracy in the printing device. As discussed above, Taubenberger teaches that the festoon device 10 always contacts the paper web. Applicants respectfully submit that this is necessary to provide the high positional accuracy for printing taught by Taubenberger. As such, the proposed modification would adversely affect the intended purpose of the device, rendering it unsatisfactory for its intended purpose. MPEP §2143.01, V.

As discussed at the personal interview, Taubenberger in fact teaches away from the modification asserted by the Office Action because the rollers of the festoon device 10 of Taubenberger are part of the stabilization zone taught by Taubenberger. As disclosed in column 4, lines 4-7, of Taubenberger, the stabilization rollers are particularly effective when the greatest possible contact area is achieved. Thus, modifying the festoon device 10 taught by Taubenberger to be a web accumulator that does not contact the paper web during normal feeding of the paper web (i.e., by moving the two fixed rollers and the one oscillating roller out of contact with the web) would reduce the stabilization provided by the stabilization zone, contrary to the specific teachings of Taubenberger. Because the web accumulator of Focke is not part of a stabilization zone, and it may be moved from contact with the paper web without any disadvantage.

Therefore, for at least the foregoing reasons, Applicants respectfully submit that a person of ordinary skill in the art would not have been motivated to make the modification asserted in the Office Action. As such, the asserted combination of Taubenberger and Focke is improper and the rejections based thereon should be withdrawn.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-11 are earnestly solicited.

Should the Examiner believe that anything further would be desirable to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,

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JAO:KLK/hs

Attachments:
Petition for Extension of Time
Machine Translation of JP 2002-321350
Partial Translation of JP 2002-321350

Date: August 10, 2006

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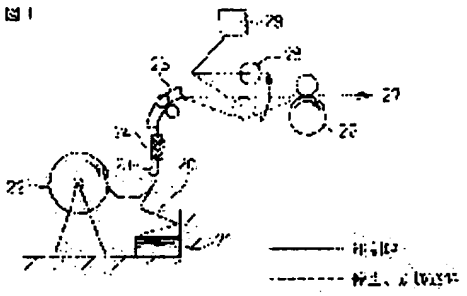
(54) CONTINUOUS PAPER CONVEYANCE MECHANISM AND PRINTING DEVICE HAVING IT

(57)Abstract:

PROBLEM TO BE SOLVED: To prevent skew of a paper sheet when conveying a continuous paper having no feed hole stably and to improve printing position accuracy when printing.

SOLUTION: This printing device having a mechanism for conveying the continuous paper 20 is provided with a friction conveyance part 26 for the continuous paper, a paper sheet braking part 24 provided on the upstream side of the friction conveyance part, a paper position regulation part 25 composed of a pair of rollers arranged obliquely by a predetermined angle θ for the direction of paper conveyance between the friction conveyance part and the paper sheet braking part, a buffer means 28 provided between the paper position regulation part and the friction conveyance part to absorb loosening of a paper sheet, and a printing part 27 arranged on the downstream side of the friction conveyance part.



LEGAL STATUS

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* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
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CLAIMS

[Claim(s)]
[Claim 1]
The friction conveyance section of a continuous-form paper, and the form braking section prepared in the upstream of this friction conveyance section, The form location specification part which consists of a roller pair arranged aslant [predetermined include-angle theta] to the form conveyance direction between said friction conveyance section and said form braking section, The airline printer which has the continuous-form paper conveyance device characterized by providing a buffer means to absorb the slack of a form established between this form location specification part and said friction conveyance section, and the printing section arranged at the downstream of said friction conveyance section.
[Claim 2]
It is the airline printer which has the extrusion member which the friction conveyance section can possess the back feed means who makes specified-quantity hard flow convey a form at the time of printing termination, and a buffer means can contact the space of a form, and can extrude this space, and it has in the continuous-form paper conveyance device according to claim 1 characterized by to provide the extrusion outlet control means which controls the extrusion outlet of this extrusion member according to the amount of back feed by the friction conveyance section at the time of printing termination.
[Claim 3]
It is the airline printer which an extrusion member is a roller or a guide member, and has the continuous-form paper conveyance device according to claim 2 characterized by being in the location estranged from a continuous-form paper at the time of printing.
[Claim 4]
The continuous-form paper transport device characterized by to provide a buffer means absorb the slack of a form established between the form location specification part which consists of a roller pair arranged aslant [predetermined include-angle theta] to the form conveyance direction between the friction conveyance section of a continuous-form paper, the form braking section prepared in the upstream of this friction conveyance section, and said friction conveyance section and said form braking section, and this form location specification part and said friction conveyance section.
[Claim 5]
It is the continuous-form paper conveyance device according to claim 4 which the friction conveyance section consists of a drive roller pair, and is characterized by carrying out friction conveyance of the continuous-form paper in between a drive roller pair.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]
This invention relates to the airline printer which possesses in more detail the continuous-form paper conveyance device in which a continuous-form paper without a feed hole is conveyed stably, and the continuous-form paper transport device suitable for using for such an airline printer about an airline printer and the transport device of a continuous-form paper.
[0002]
[Description of the Prior Art]
The feed hole which followed both that edge, followed the continuous-form paper side in the feed direction, and was prepared at equal intervals when a continuous-form paper was conventionally printed by the printer is prepared, the tractor which has the pin which fits into the feed hole of a continuous-form paper is formed, and when this tractor rotated, he was trying to convey a continuous-form paper by the printer side on the other hand.

[0003]
For this reason, since a predetermined feed hole must be prepared in a form and the part of both the edges of a form becomes unnecessary after about [that it cannot use for printing] and printing, the part of both edges must be cut off and disposed of by after treatment etc. Therefore, the technique of conveying a continuous-form paper without a feed hole also from viewpoints, such as a form conversion cost, is searched for.
[0004]
For example, the conveyance technique of continuous form in which there is no feed hole in the patent reference 1 is indicated. The technique indicated by the patent reference 1 is shown in drawing 2 .
[0005]
drawing 2 -- setting -- A -- a form and PZ -- feed equipment and DA -- a printing unit, 1, or 11 -- form-feed lump equipment, and 2 and 4 -- for vacuum brake and 7, as for friction drive equipment and 9, a vacuum pump and 8 are [a roller and 3 / form centering apparatus and 6 / a stabilization roller and 10] loop-formation draft gears.
[0006]
The conveyance device of a continuous-form paper without a feed hole Friction drive equipment, i.e., drive roller pair 8, The form braking member (vacuum brake 6) which sandwiches a continuous-form paper between the upstream concerned of drive roller pair 8, and brakes a form to the conveyance direction is provided. In the meantime the form location regulation device (centering apparatus 3) for maintaining the location of a form at a convention location prepares in the form conveyance direction and the direction which intersects perpendicularly -- having -- this form location regulation device -- the form conveyance direction -- receiving -- an include angle theta -- the roller pair arranged aslant -- it is 4.
[0007]
the drive roller pair which carries out friction conveyance with the form location regulation device 3 -- between 8, the vacuum brake 6 which gives tension to a form, the mechanical accumulator 9, and the loop-formation draft gear 10 are formed respectively, the tension of a form is fixed, and form conveyance is stabilized.
[0008]
A continuous-form paper airline printer here at the time of a printing initiation halt In order to rise to constant

speed on the property of the conveyance motor which drives form conveyance or to make it stop from constant speed Since a certain time amount is required, while conveying a certain die-length A continuous-form paper, it rises to constant speed. In order to perform control of stopping when a certain die-length B continuous-form paper is conveyed at the time of a halt and to lose gap A+B of the form location at the time of printing initiation and a halt When only the amount of [of A+B] die length makes a continuous-form paper convey to hard flow at the time of a halt, usually [without establishing a useless margin] it controls to print continuously.

[0009]

By this well-known example, in case a form is conveyed to hard flow, since a form skew occurs and form transit stops being stabilized by the form location regulation device when the slack of a continuous-form paper occurs, it absorbed form slack with the loop-formation draft gear 10, suppressed the slack of a form, and has prevented the form skew.

[0010]

As other well-known examples, there are patent reference 2 and patent reference 3. By the patent reference 2, in order to perform actuation of the curl picking device of the recording paper, and discharge by the easy device and to aim at improvement in the file nature of the recording paper, reversing a pressure-welding roller is indicated. That is, prevention of the recording paper, bending as a means to perform discharge from the curl picking device of the recording paper, at the time of un-recording by estranging the recording paper from the reverse camber section of a curl picking device, and a peculiarity being attached is aimed at. [after record termination]

[0011]

Moreover, in order for the form of a continuous-form paper to prevent a gap and to prevent generating of the imprint blot at the time of printing initiation in the continuous-form paper conveyance device in which it comes to provide the paper feed tractor which conveys a continuous-form paper from a hopper to the direction of a photoconductor drum by the patent reference 3 Spring energization is carried out so that the space of a continuous-form paper may always be contacted and a buffer means to absorb the slack of a continuous-form paper may be extruded between the form braking member which sandwiches the space of a continuous-form paper by the upstream of a paper feed tractor, and is braked in the conveyance direction, and this form braking member and a paper feed tractor.

[0012]

[Patent reference 1]

Patent Publication Heisei No. 507666 [nine to] official report

[Patent reference 2]

JP,7-247045,A

[Patent reference 3]

JP,9-86742,A

[0013]

[Problem(s) to be Solved by the Invention]

However, the well-known example (drawing 2) indicated by the patent reference 1 has the following faults.

[0014]

Since the vacuum brake 6 which gives tension to a form, the mechanical accumulator 9, and the loop-formation draft gear 10 are formed respectively, components mark increase and equipment cost and size increase.

[0015]

the drive roller pair which positions the end face of a form by the form location regulation device 3, and carries out friction conveyance, although form conveyance is carried out in 8 the drive roller pair which carries out friction conveyance from the form location regulation device 3, since there is a roller formed in the accumulator 9 arranged so that a form may be twisted between 8, or the loop-formation draft gear 10 Since the form skew component to the conveyance direction of these rollers occurs, the components precision of each roller and installation precision must be set up strictly.

[0016]

Moreover, since the location of a rocking roller established in the loop-formation draft gear 9 of an accumulator at the time of printing is changed and the skew component which a rocking roller gives to a form since a form and a roller twist and an amount changes is changed with the amount of form volume attachments of the roller

which moves, a wandering operation of this part is nonavoidable.
[0017]
Moreover, as conventionally well-known approaches other than the above-mentioned well-known example, a form braking member is not prepared in the upstream of a TORAIBU roller pair which carries out friction conveyance, but it has the conveyance device in which a form is conveyed to a hopper area, and there is also the approach of carrying out a technique which controls to reverse-convey at the time of the back feed of a form. However, when reverse-conveying, in order according to this approach to have to carry out drive control of the form location regulation device which consists of the roller pair aslant arranged to the form conveyance direction and to have to change a setup of the include angle theta to the form conveyance direction, a device and the control approach are complicated, components mark also increase, and the magnitude of equipment etc. becomes disadvantageous.
[0018]
So, it aims at preventing the skew of a form, when conveying a continuous-form paper without a feed hole to stability, and aiming at improvement in the printing location precision at the time of printing in the invention in this application.
[0019]
[Means for Solving the Problem]
In order to attain the above-mentioned technical problem, according to this invention, the friction conveyance section of a continuous-form paper, The form location specification part which consists of a roller pair arranged aslant [predetermined include-angle theta] to the form conveyance direction between the form braking section prepared in the upstream of this friction conveyance section, and said friction conveyance section and said form braking section, The airline printer which has the continuous-form paper conveyance device characterized by providing a buffer means to absorb the slack of a form established between this form location specification part and said friction conveyance section, and the printing section arranged at the downstream of said friction conveyance section is offered.
[0020]
It has the extrusion member which the friction conveyance section can possess the back feed means who makes specified quantity hard flow convey a form at the time of printing termination, and a buffer means can contact the space of a form, and can extrude this space, and is characterized by providing the extrusion outlet control means which controls the extrusion outlet of this extrusion member according to the amount of back feed by the friction conveyance section at the time of printing termination.
[0021]
An extrusion member is a roller or a guide member, and it is characterized by being in the location estranged from a continuous-form paper at the time of printing.
[0022]
Moreover, the form braking section which was prepared in the upstream of the friction conveyance section of a continuous-form paper, and this friction conveyance section according to this invention, The form location specification part which consists of a roller pair arranged aslant [predetermined include-angle theta] to the form conveyance direction between said friction conveyance section and said form braking section, The continuous-form paper transport device characterized by providing a buffer means to absorb the slack of a form established between this form location specification part and said friction conveyance section is offered.
[0023]
The friction conveyance section consists of a drive roller pair, and it is characterized by carrying out friction conveyance of the continuous-form paper in between a drive roller pair.
[0024]
[Embodiment of the Invention]
Hereafter, the gestalt of operation of this invention is explained to a detail with reference to an accompanying drawing.
[0025]
The airline printer which possesses the continuous-form paper conveyance device of this invention in drawing 1 is shown typically.
[0026]

A continuous-form paper 20 folds the feed section of the continuous-form paper 20 without a feed hole, when it is the continuous-form paper of a tatami gestalt, it breaks into a hopper 21, the continuous-form paper of a tatami gestalt is set, and a continuous-form paper 20 lets it out continuously from this hopper 21. On the other hand, when a continuous-form paper 20 is a continuous-form paper of a roll gestalt, the continuous-form paper wound around the roll 22 lets out continuously. In this case, although not illustrated, it is desirable to establish separately the means for carrying out drive control of the roll 22.

[0027]

The continuous-form paper 20 which it let out from the feed section passes a roller 23, passes the form braking section thru/or the tension grant section 24, the form location specification part 25, and the form friction conveyance section 26, and is conveyed to the printing section 27.

[0028]

the friction conveyance section 26 for carrying out friction conveyance of the continuous-form paper 20 without a feed hole -- a drive roller pair -- it consists of 26. namely, a roller pair -- one rollers are [a driving roller and the roller of 26 of another side] opposite rollers, and a continuous-form paper 20 is that the rotation drive of the driving roller is carried out, it resists the damping force by the form braking section 24 by the frictional force by these roller pairs, and is conveyed in the conveyance direction. The form location specification part 25 which consists of the roller pair aslant arranged to the shaft which intersects perpendicularly with the form conveyance direction between drive roller pair 26 and the form braking section 24 prepared in the upstream is formed. This form location specification part 25 carries out the operation which regulates the edge by the side of one to a position to a continuous-form paper 20 chiefly, without giving damping force to a continuous-form paper 25.

[0029]

moreover, the drive roller pair which carries out friction conveyance with the form location specification part 25 -- between 26 -- the time of a printing halt -- a friction conveyance drive roller pair -- the buffer roller or the guide member 28 driven by the drive of the driving means 29 of the motor which is not illustrated so that the space of a continuous-form paper 20 may be contacted and the slack of a form may be absorbed is prepared according to the amount of back feed in which 26 carries out inverse rotation and conveys a continuous-form paper 20 to hard flow.

[0030]

During printing of equipment, this roller or the guide member 28 is formed so that it may estrange completely from a continuous-form paper 20. That is, the roller or the guide member 20 is made to be separated from the straight-line conveyance path of the continuous-form paper 20 between the form friction conveyance section 26 and the form location specification part 25. Therefore, the tension concerning the continuous-form paper 20 from the form damping device 24 to friction conveyance drive roller pair 26 serves as a predetermined value during printing. In order that a continuous-form paper 20 may position according to the form location regulation device 25 which consists of the roller pair arranged aslant [predetermined / include-angle theta] to the form conveyance direction so that the form edge may serve as a position, transit of a continuous-form paper 20 is stabilized.

[0031]

Moreover, since the roller or the guide member 28 which is a buffer means is separated from the space of a continuous-form paper 20 during printing as mentioned above, there is nothing, and it becomes impossible for a wandering operation to occur, and a form skew cannot occur, but the factor which makes a continuous-form paper 20 generate a skew between friction conveyance drive roller pair 26 as the form location regulation device 24 can improve printing precision.

[0032]

Furthermore, the mechanical accumulator needed in the well-known example between friction conveyance drive roller pair 26 as the form location regulation device 24 becomes unnecessary, components mark decrease, and equipment cost and size can be stopped.

[0033]

Moreover, without performing complicated control for driving these driving means, since the driving means of a roller etc. is not needed for the form braking section 24 and it does not have the drive controlling mechanism in the form location specification part 25, there are few components mark and they can stop equipment cost and size.

[0034]
As mentioned above, although the buffer section which consists of a roller or a guide member 28 is estranged from the space of a continuous-form paper 20 during printing of equipment, it is driven by the driving means 29 at the time of a halt of printing, and initiation. If a roller or the guide member 28 drives, the space of a continuous-form paper 20 will be contacted, and it will act so that this may be extruded. Since the frictional force which the form friction conveyance section 26 exerts on a continuous-form paper 20 is larger than the tension which the form braking section thru/or the form tension grant section 24 have given to the continuous-form paper 20 in that case, a continuous-form paper 20 will resist the frictional force of the friction conveyance section 26 according to actuation of a roller or the guide member 28, will have a continuous-form paper 2 extruded, and will separate from the straight-line conveyance way at the time of printing.
[0035]
Drawing 3 is a timing chart which shows the relation between the location of the continuous-form paper 20 at the time of a printing halt, the friction conveyance drive roller 26, and the buffer section 25. illustration -- like -- a drive roller pair -- by the time 26 suspends a motor from the page back end of printing, many 1 inch (25mm) forms will be conveyed, and it will stop. A drive roller 26 is reversed after a halt and a 2 inch (50mm) form is returned. A drive roller 26 is reversed, the buffer section 28 is driven early more slightly than the timing which returns a continuous-form paper 20, and the drive of the buffer section 28 is slightly stopped late from the timing to which a drive roller 26 suspends an inversion.
[0036]
The drive of the buffer section 28 is driven with the speed which absorbs the slack of the continuous-form paper 20 generated at the time of a drive roller inversion. That is, the buffer section 28 controls an extrusion outlet according to the amount of back feed at the time of printing termination. Thereby, since a form stops where 1 inch (25mm) is returned, and it can prevent generating of a continuous-form paper 20 of slack rather than printing of degree page, the location of a continuous-form paper 20 does not shift.
[0037]
Drawing 4 is a timing chart which shows the relation between the location of the continuous-form paper at the time of printing initiation, the friction conveyance drive roller 26, and the buffer section 25. Like illustration, the continuous-form paper 20 at the time of printing initiation has stopped from the page start edge of printing in the location to which the 1 inch (25mm) form was returned. The drive of the buffer section 25 is started to the standup and coincidence of a drive roller 26 at the time of printing initiation. A continuous-form paper 20 is conveyed by normal rotation of a drive roller 26, in order that the buffer section 26 may estrange from the space of a continuous-form paper 20 according to the amount of buffers of the continuous-form paper by the buffer section 25 decreasing and going, form slack stops occurring at the printing initiation time, and the location of a continuous-form paper 20 does not shift.
[0038]
Although the gestalt of operation of this invention was explained with reference to the accompanying drawing above, this invention is not limited to the gestalt of the above-mentioned operation, and various gestalten, deformation, correction, etc. are possible for it to the pneuma of this invention thru/or within the limits.
(Additional remark 1) The friction conveyance section of a continuous-form paper, and the form braking section prepared in the upstream of this friction conveyance section, The form location specification part which consists of a roller pair arranged aslant [predetermined include-angle theta] to the form conveyance direction between said friction conveyance section and said form braking section, The airline printer which has the continuous-form paper conveyance device characterized by providing a buffer means to absorb the slack of a form established between this form location specification part and said friction conveyance section, and the printing section arranged at the downstream of said friction conveyance section. (1)
(Additional remark 2) The friction conveyance section is an airline printer given in the additional remark 1 possessing the back feed means who makes specified quantity hard flow convey a form at the time of printing termination.
(Additional remark 3) A buffer means is an airline printer given in the additional remark 1 which has the extrusion member which can contact the space of a form and can extrude this space.
(Additional remark 4) Airline printer given in the additional remark 3 characterized by providing the extrusion outlet control means which controls the extrusion outlet of said extrusion member according to the amount of

back feed by the friction conveyance section at the time of printing termination.
(Additional remark 5) It is the airline printer which has the extrusion member which the friction conveyance section possesses the back feed means who makes specified-quantity hard flow convey a form at the time of printing termination, and a buffer means contacts the space of a form, and extrudes this space, and it has in the continuous-form paper conveyance device according to claim 1 characterized by to provide the extrusion outlet control means which controls the extrusion outlet of this extrusion member according to the amount of back feed by the friction conveyance section at the time of printing termination. (2)
(Additional remark 6) An extrusion member is an airline printer given in the additional remarks 3-5 which are a roller or a guide member.
(Additional remark 7) At the time of printing, it is an airline printer given in the additional remark 6 in the location estranged from a continuous-form paper.
(Additional remark 8) It is an airline printer given in the additional remarks 6-7 which an extrusion member is a roller or a guide member, and are in the location estranged from a continuous-form paper at the time of printing. (3)
(Additional remark 9) The friction conveyance section of a continuous-form paper, and the form braking section prepared in the upstream of this friction conveyance section, The form location specification part which consists of a roller pair arranged aslant [predetermined include-angle theta] to the form conveyance direction between said friction conveyance section and said form braking section, The continuous-form paper transport device characterized by providing a buffer means to absorb the slack of a form established between this form location specification part and said friction conveyance section. (4)
(Additional remark 10) It is a continuous-form paper conveyance device given in the additional remark 9 which the friction conveyance section consists of a drive roller pair, and is characterized by carrying out friction conveyance of the continuous-form paper in between a drive roller pair. (5)
(Additional remark 11) The frictional force over the continuous-form paper of the friction conveyance section is a continuous-form paper conveyance device given in the additional remarks 9-11 which are size from the tension to which the form braking section acts on a continuous-form paper.
[0039]
[Effect of the Invention]
As mentioned above, according to the airline printer possessing the continuous-form paper conveyance device in which a continuous-form paper without the feed hole of this invention is conveyed, the form skew of a continuous-form paper is prevented, form conveyance stabilized with a sufficient precision can be performed, and there is effectiveness which can improve printing precision by this.
[Brief Description of the Drawings]
[Drawing 1] The airline printer possessing the continuous-form paper conveyance device of this invention is shown typically.
[Drawing 2] The airline printer possessing the continuous-form paper conveyance device of a well-known example is shown.
[Drawing 3] It is the timing chart which shows the relation between the location of the continuous-form paper at the time of a printing halt, a drive roller, and the buffer section.
[Drawing 4] It is the timing chart which shows the relation between the location of the continuous-form paper at the time of printing initiation, a drive roller, and the buffer section.
[Description of Notations]
20 -- Continuous-form paper
21 -- Hopper
22 -- Roll
23 -- Laura Nakama
24 -- Form braking (tension grant) section
25 -- Form location specification part
26 -- Form friction conveyance section
27 -- Printing section
28 -- Buffer section
29 -- Driving means

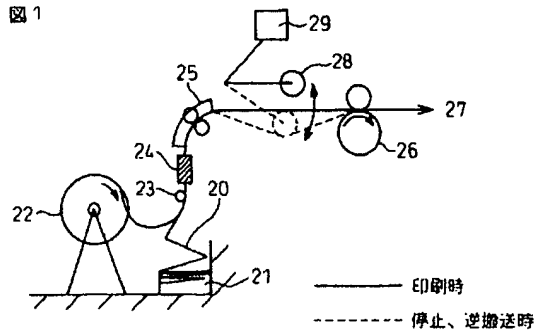
[Translation done.]

* NOTICES *

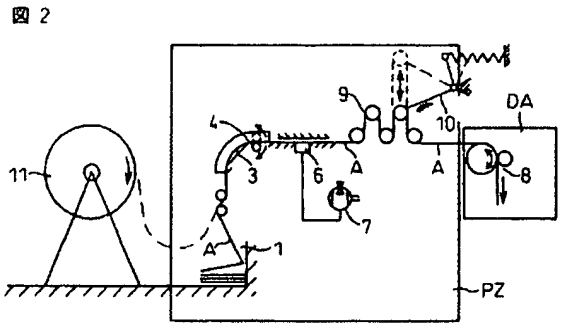
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

[Drawing 1]



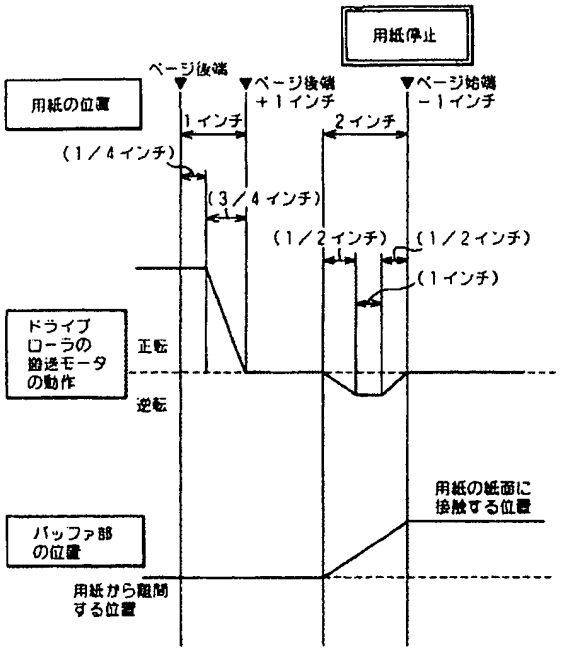
[Drawing 2]



[Drawing 3]

図 3

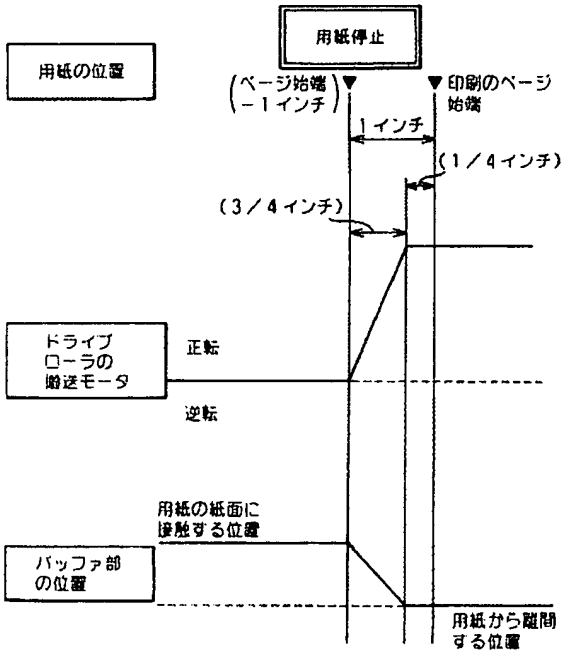
印刷停止時の用紙の位置とドライブローラ、バッファ部のタイミング



[Drawing 4]

図 4

印刷開始時の用紙の位置とドライブローラ、バッファ部のタイミング

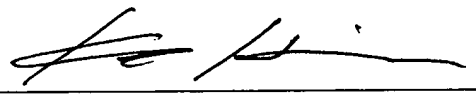


[Translation done.]

CERTIFICATION OF ENGLISH LANGUAGE
TRANSLATION OF PRIORITY DOCUMENT

I, Kentaro Higuchi, hereby declare and state that I am knowledgeable of each of the Japanese and English languages. I hereby certify that the attached English language translation is a complete and accurate translation of paragraph [0035] of Japanese Patent Application Number 2002-321350.

August 10, 2006
Date


Signature

Kentaro Higuchi
Typed Name

[0035]

Fig. 3 is a timing chart showing the relationships between the position of the continuous paper, friction-feeding drive rollers 26 and a buffer part 25 at the stopping of printing. As shown in the figure, the drive roller pair 26 overfeeds the paper by 1 inch (25 mm) from the rear end of the page to be printed by the time the motor stops, and the driver rollers 26 stop. After the drive rollers 26 stop, it is reverse-rotated to return the paper by 2 inches (50 mm). The buffer section 28 is driven slightly earlier than the timing at which the driver rollers 26 are reverse-rotated to return the paper 20, and stops slightly later than the timing at which the drive rollers 26 stop its reverse rotation.